

Remarks

Claims 1-20 were pending in the application. Claims 4, 5, and 7 are amended to reflect sufficient antecedent basis. Reconsideration is respectfully requested.

Rejections Under 35 U.S.C. § 112

Claims 1-20

Claims 1-20 were rejected under 35 U.S.C. § 112, first paragraph, "as containing subjected matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention." Office action, at 2. This rejection is respectfully traversed.

With regard to claim 1, the Examiner states, "[c]laim 1 specifies the step of 'discriminating against cavitation events'. However, the instant specification does not describe such a 'discriminating' step and thus does not provide an enabling disclosure." Office action, at 2. Applicant respectfully disagrees.

The specification describes a "discriminating" step in at least the following specification passage. The Background of the Invention recites "[o]ne problem is discrimination of the energy pulses produced by the perturbation of interest from energy pulses introduced by other agencies that are not of interest." Applicant's specification, page 1, second full paragraph, lines 6-8. In particular, Applicant's specification recites, "[w]hat is needed is a system that (1) provides an accurate measurement of the number of cavitation events present in a selected volume of a liquid and (2) discriminates against, or substantially eliminates, the effect of cavitation that occur elsewhere, not within the selected volume." Applicant's specification, at 2, lines 2-4. Thus, by "discriminating

against cavitation events that occur in the fluid outside the selected volume" the effects of cavitation that occur elsewhere, not within the selected volume, are discounted or substantially eliminated when, as recited in claim 1, "sensing energy pulses associated with a plurality of cavitation events in a selected volume of the fluid." Therefore, Applicant respectfully submits that the specification provides an enabling disclosure.

With regard to claim 8, the Examiner states, "it is not clear where the 'mapping' of cavitation events is described in the instant specification." Office action, at 2. In response, Applicant submits that Applicant's specification recites, "[m]oving the probe between different specific locales within Liquid L1 in container 17 to measure relative cavitation provides a map of cavitation density and intensity in three spatial dimensions and time. At a constant amplitude and frequency, cavitations within the container 17 can be easily measured and displayed as a three dimensional map." Applicant's specification, page 8, lines 11-14. Therefore, Applicant respectfully submits that mapping is described in the instant specification in at least this passage.

Lastly, the Examiner states, "with respect to claim 12, it is questioned how 'an electromagnetic pulse of energy' propagates through a fluid. It is questioned whether an acoustic pulse is what is propagated." Office action, at 2. In response, Applicant respectfully submits that claim 12 recites, in pertinent part, "receiving a signal representing the at least one electromagnetic pulse at a photomultiplier positioned adjacent to a selected surface of the second fluid, thereby creating an electronic signal..." Claim 12 does not recite that an electromagnetic pulse of energy propagates through a fluid. Therefore, the rejection to claim 12 should be withdrawn.

For at least these reasons, Applicant respectfully submits that the rejections to claims 1, 8 and 12 should be withdrawn. Claims 2-7 depend from claim 1, claims 9-11 depend

from claim 8, and claims 13-20 depend from claim 12. The rejections to these dependent claims should be withdrawn for at least the reasons discussed above with regard to the corresponding independent claim.

Claim 4

Claim 4 was rejected for having insufficient antecedent basis for the limitation "the energy perturbations." Applicant respectfully submits that the term "perturbations" was amended to recite "pulses" in claims 4, 5 and 7. Therefore, Applicant respectfully submits that sufficient antecedent basis is reflected in the claims.

Prior Art Made of Record and Not Relied Upon

The Examiner made of record, but did not rely upon, U.S. Patent No. 4,564,422 to Simoneau et al. and U.S. Patent No. 5,074,150 to Tirelli et al. The Examiner stated that these patents are considered pertinent to Applicant's disclosure. Applicant respectfully disagrees.

With respect to U.S. Patent No. 4,564,422, Applicant submits that it fails to teach or suggest Applicant's claimed invention. Simoneau et al. were concerned with measuring the intensity of erosive cavitation present in an aqueous solution by providing a constant anodic voltage across a working electrode by means of auxiliary and reference electrodes and by measuring a variation in the intensity of the current to determine the intensity of cavitation which was disclosed as being directly proportional to the intensity of erosive cavitation in the measure zone.

Simoneau was not concerned with discriminating against cavitation events, as recited in Applicant's independent claim 1. Discrimination, as recited in Applicant's claim 1, is advantageous in that it discriminates against the effect of cavitation events that occur elsewhere, or not within the selected volume. Applicant's specification, page 2, lines 2-4.

Further, Applicant's independent claim 8 recites, "identifying by three dimensional coordinates within the fluid the specific locations of the first and second selected volumes and the respective cavitation events for each of the selected volumes." In contrast, Simoneau et al. was not concerned with such identification.

Additionally, Applicant's independent claim 12 recites, "receiving at a thin plate a selected first energy perturbation associated with a cavitation in a first selected fluid, the thin plate separating the first selected fluid from a second selected fluid..." In contrast, Simoneau fails to teach or suggest a thin plate separating a selected first fluid from a second selected fluid.

Therefore, for at least the reasons presented above, Simoneau et al. fail to teach or suggest Applicant's claimed invention.

With respect to U.S. Patent No. 5,074,150 to Tirelli et al., Applicant respectfully submits that it fails to teach or suggest Applicant's claimed invention. Specifically, Tirelli et al. were concerned with measuring a cavitation rate with an apparatus including a transducer in contact with the liquid under cavitation and a filter and amplifier electrically connected to the transducer for providing on the output of the amplifier a signal containing information about cavitation. The signal is processed and displayed by two circuits. The patent states that the apparatus includes "discriminating means, electrically connected to said filtering and amplification means for isolating from said signal the information of interest (flashes not from cavitation or boiling)...." Tirelli et al., col. 2, lines 39-42.

In contrast, Applicant was concerned with a system that "discriminates against, or substantially eliminates, the effect of cavitation events that occur elsewhere, not within the selected volume." Applicant's specification, page 2, lines 3-5. Applicant's independent claim 1 recites,

"discriminating against cavitation events that occur in the fluid outside the selected volume." Tirelli et al., on the other hand, were concerned with discriminating flashes not from cavitation or boiling from signals from cavitation or boiling.

Further, Applicant's independent claim 8 recites, "identifying by three dimensional coordinates within the fluid the specific locations of the first and second selected volumes and the respective cavitation events for each of the selected volumes." In contrast, Tirelli et al. were not concerned with such identification.

Additionally, Applicant's independent claim 12 recites, "receiving at a thin plate a selected first energy perturbation associated with a cavitation in a first selected fluid, the thin plate separating the first selected fluid from a second selected fluid..." In contrast, Tirelli et al. fail to teach or suggest a thin plate separating a selected first fluid from a second selected fluid.

Therefore, for at least the reasons presented above, Tirelli et al. fail to teach or suggest Applicant's claimed invention.

Claims 2-7 depend from claim 1, claims 9-11 depend from claim 8, and claims 13-20 depend from claim 12. These dependent claims are therefore distinguished from the cited references for at least the reasons discussed above with regard to the corresponding independent claims.

#### Drawings

A substitute set of drawings is being submitted herewith. A Letter to Chief Draftsperson is enclosed.

Conclusion

For at least the reasons submitted above, Applicant respectfully submits that the claims are in condition for allowance. Accordingly a Notice of Allowance is respectfully requested.

CERTIFICATE OF MAILING

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, Alexandria, VA 22313

Signed: *Sally Azevedo*  
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